

NASA EDUCATION GRANT
FINAL REPORT
NAG-1-2226

ON
“PORTSMOUTH ATMOSPHERIC
SCIENCE SCHOOL PROJECT (PASS)”

FOR PERIOD
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Portsmouth Atmospheric Science School (PASS) Project

NASA Research Grant NAG-1-2226

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INTRODUCTION

The Portsmouth Atmospheric Science School Project (PASS) Project was granted a one-year no cost extension for 2001-2002. In year three of the project, objectives and strategies were modified based on the previous year-end evaluation. The recommendations were incorporated and the program was replicated within most of the remaining elementary schools in Portsmouth, Virginia and continued in the four middle schools.

The Portsmouth Atmospheric Science School Project is a partnership, which includes Norfolk State University, Cooperating Hampton Roads Organizations for Minorities in Engineering (CHROME), NASA Langley Research Center, and the City of Portsmouth, Virginia Public Schools. The project seeks to strengthen the knowledge of Portsmouth Public Schools students in the field of atmospheric sciences and enhance teacher awareness of hands on activities in the atmospheric sciences. The project specifically seeks to: 1) increase the interest and participation of elementary and middle school students in science and mathematics; 2) strengthen existing science programs; and 3) facilitate greater achievement in core subjects, which are necessary for math, science, and technical careers. Emphasis was placed on providing training activities, materials and resources for elementary students (grades 3 - 5) and middle school students (grades 6 - 8), and teachers through a CHROME club structure. The first year of the project focused on introducing elementary students to concepts and activities in atmospheric science. Year two of the project built on the first year's activities and utilizes advanced topics and activities appropriate for middle school students. During the third year of the project, in addition to the approaches used in years one and two, emphasis was placed on activities that enhanced the Virginia Standards of Learning (SOL).

The Project objectives are as follows for Year 3: 1) Use the program curricula in atmospheric science in the resource guide, which was developed by the PASS Project coordinators in conjunction with NSU faculty and the NASA Langley Research Center's Office of Education, to provide club activities, speakers and field trips; 2) Continue to network with the mathematics and science supervisors as liaisons for the project and to assist in incorporating the Virginia Standards of Learning Objectives; 3) Use two pre-service teachers enrolled at Norfolk State University to assist with this project (senior elementary education majors); 4) Host a half-day kick off workshop for all elementary and middle school PASS Sponsors and participating pre-service teachers; 5) Train sponsors in at least 80% of the Portsmouth elementary and middle schools to serve as CHROME club sponsors and implement a club in their respective schools; 6) Recruit a minimum of 250 elementary and middle school students to participate in the newly established and existing CHROME clubs; 7) Introduce an array of fun, hands-on and creative experiences in atmospheric sciences during monthly CHROME club meetings; and 8) Supplement CHROME club activities with a summer academy, Young PHDs (Persons Having Dreams) in Atmospheric Science, for 25 elementary and 25 middle school students.

ENROLLMENT DATA

The project, in its third year, currently has participating PASS programs at the following Portsmouth schools: Brighton Elementary School, Churchland Academy Elementary School, Churchland Primary and Intermediate Elementary School, Douglass Park Elementary School, Emily Spong Elementary School, Highland Biltmore Elementary School, Hodges Manor Elementary School, James Hurst Elementary School, John Tyler Elementary School, Lakeview Elementary School, Park View Elementary School, Port Norfolk Elementary School, S. H. Clarke Academy Elementary School, Susie Keele Community CHROME Club, and Westhaven Elementary School. There are a total of eighteen elementary schools in Portsmouth City Public Schools and one community CHROME Club

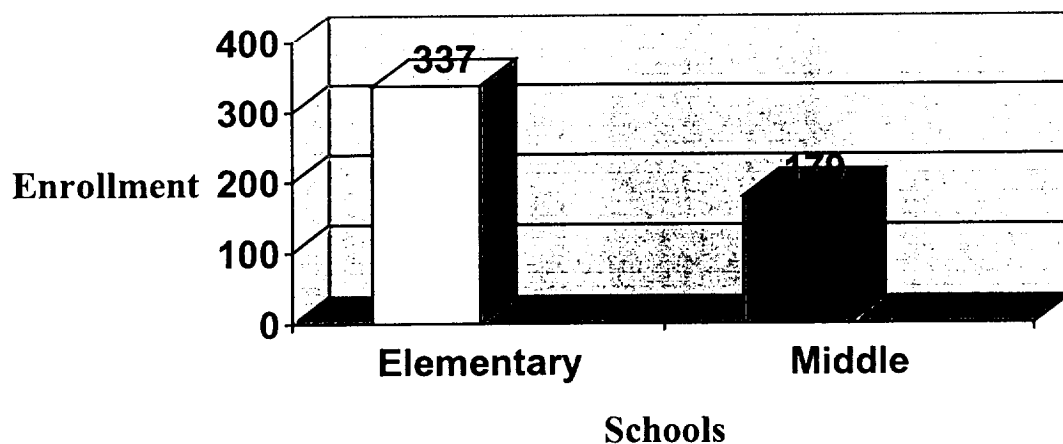
There are also four (4) middle schools in the City of Portsmouth that include: Churchland Middle School, Cradock Middle School, Hunt-Mapp Middle School and W. E. Waters Middle School. In year 3 PASS Membership was offered to all elementary and middle schools in Portsmouth City Public Schools. Four elementary schools declined participation in the project this year. Those schools are, Churchland Elementary School, Mt. Hermon Elementary, Olive Branch Elementary School, and Simonsdale Elementary School. Several attempts were made to contact the principals via the phone and through correspondence.

There are a total of five hundred sixteen Portsmouth elementary and middle school students participating in the Portsmouth Atmospheric Science School (PASS) Project. There are 58 sponsors serving in the 19 participating school and community clubs. Chart1, on the next page, shows a breakdown of the number of students participating in their respective school's CHROME Club.

There are currently three hundred thirty-seven elementary students and one hundred seventy-nine middle school students. Bar Graph 1 depicts a visual breakdown.

BAR GRAPH 1 -- Student Enrollment -- Year 3

PASS Project CHROME Membership 2001-2002



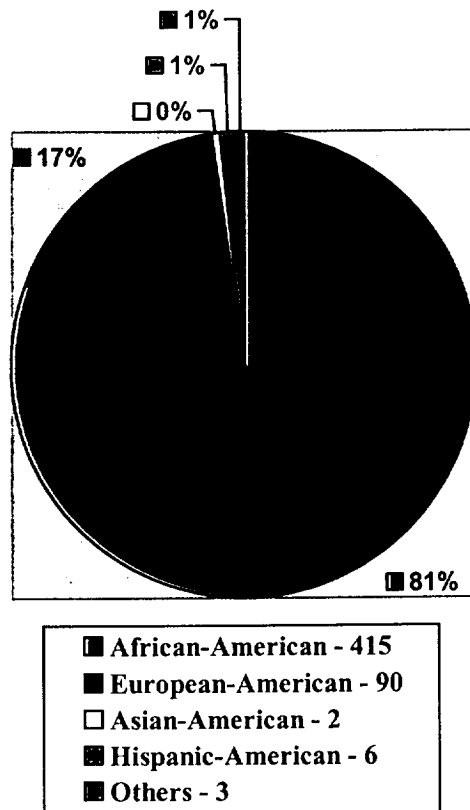
Pie Graph 1 and Bar Graph 2 on Page 4 depicts a visual breakdown of students by race and gender respectively.

CHART 1 -- PASS Active Schools & Student Enrollment -- Year 3

Schools	Number of Students Enrolled
Elementary Schools	
Brighton Elementary School	8
Churchland Academy Elementary School	77
Churchland Primary & Intermediate	10
Douglass Park Elementary School	44
Emily Spong Elementary School	9
Highland-Biltmore Elementary School	20
Hodges Manor Elementary School	21
James Hurst Elementary School	27
John Tyler Elementary School	14
Lakeview Elementary School	14
Park View Elementary School	12
Port Norfolk Elementary School	20
S. H. Clarke Academy Elementary School	18
Susie Keele Community CHROME Club	26
Westhaven Elementary School	17
<u>Middle Schools</u>	
Churchland Middle School	44
Cradock Middle School	50
Hunt-Mapp Middle School	62
W. E. Waters Middle School	23
Total number of students enrolled	516

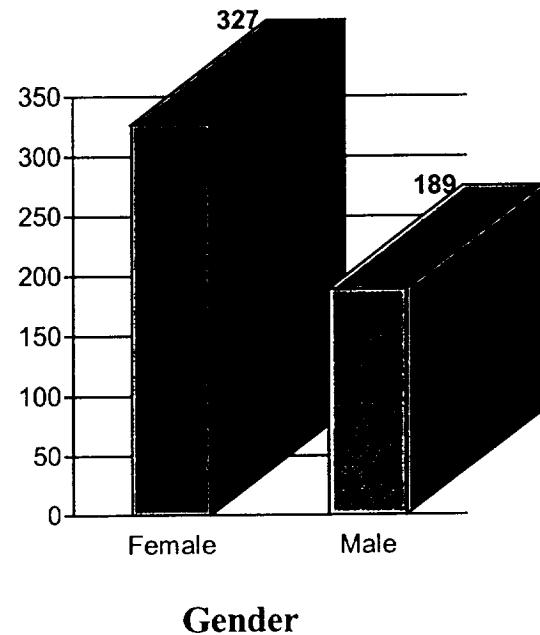
PIE GRAPH 1 -- Race of Students -- Year 3

**PASS Student Ethnic Breakdown
2001-2002**



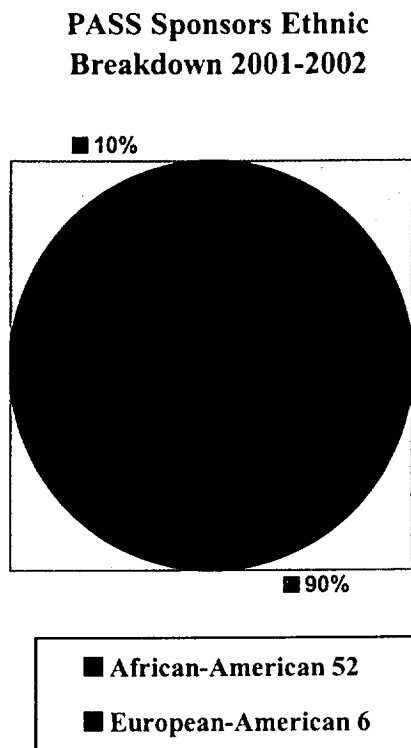
BAR GRAPH 2 -- Gender of Students -- Year 3

**PASS Student Gender Breakdown
2001 - 2002**

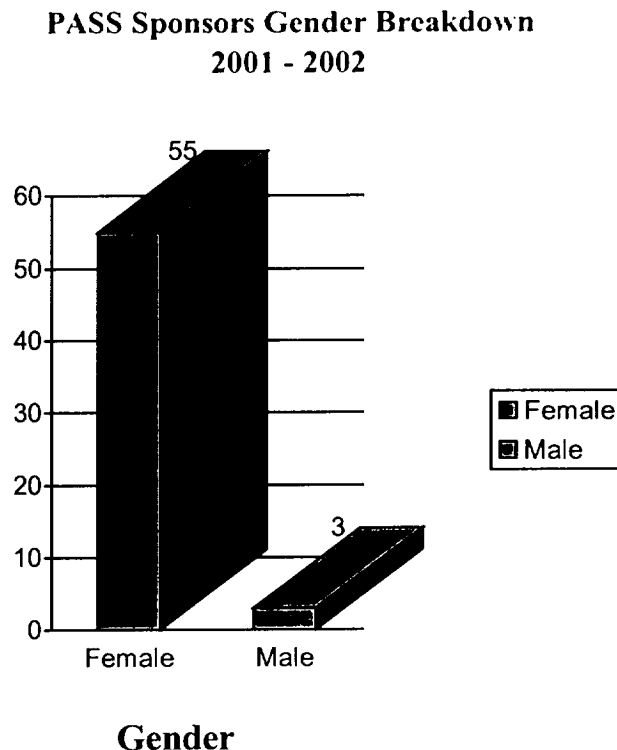


Of the fifty-eight sponsors participating in the PASS Project, fifty-two of them are African-American (Black) and six of them are European-American. When looking at gender, the female sponsors overwhelmingly outnumber the males. There are fifty-five female sponsors and only three male sponsors. Pie Graph 2 on the next page shows the ethnic breakdown of the sponsors and Bar Graph 3 on the next page shows the gender breakdown.

PIE GRAPH 2 -- Race of Sponsors – Year 3



BAR GRAPH 3 -- Gender of Sponsors – Year 3



CLUB ACTIVITIES 2001-2002

Club sponsors were given materials relating to atmospheric sciences and trained to conduct activities relating to the topic. Listed below are excerpts from a few of the activities conducted by the schools throughout the academic year. These activities were taken from Activity Reports that are required to be submitted by each sponsor at the close of each school year.

Elementary School CHROME Club Activities

Brighton Elementary School

- ❖ The CHROME Sponsors held an organizational meeting for old members and students who were interested in participating in the CHROME Club.
- ❖ Students made bubble bombs to show how an acid and a base create bubbles. Other variations of this initial experiment were tried and results were recorded.

Churchland Academy Elementary School

- ❖ The CHROME Sponsors held an organizational meeting for students who were interested in becoming members of the CHROME Club
- ❖ A National Oceanic and Atmospheric Administration (NOAA) representative presented a hands-on activity dealing with Oceanography and graphs.

Churchland Primary & Intermediate Elementary School

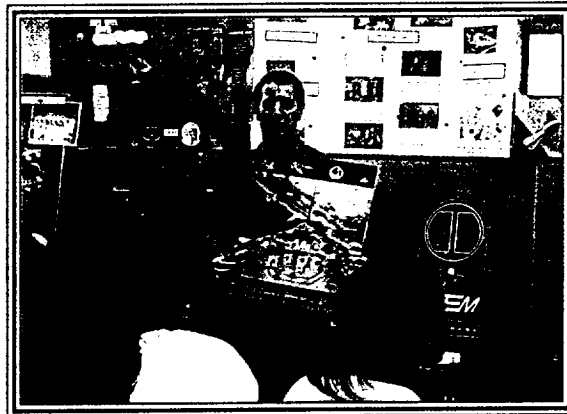
- ❖ A NOAA representative presented a hands-on activity on Longitude and Latitude.
- ❖ Students presented oral reports on Famous African-Americans such as Granville T. Woods, Garrett Morgan Sarah Boone, and Lydia Newman.
- ❖ CHROME Sponsors presented a hands-on activity.

Douglass Park Elementary School

NOAA volunteers, introduced a variety of hands-on activities with the students:

- ❖ Tropical Storms and Hurricanes
- ❖ Cloud Formation
- ❖ Longitude and Latitude
- ❖ Air Pressure
- ❖ Layers of the Atmosphere

Douglass Park CHROME Students also participated in the Space Shuttle Adventure Project. This was a joint project with I. C. Norcom High School, and Hilton Elementary School. Douglass Park conducted an experiment with the developmental growth of corn seeds that had been exposed to 'Zero Gravity'.



Charles Brodell from the NASA Flight Facility at Wallops Island explains the integration process for a science experiment that Douglass Park Students flew on the space shuttle.

Emily Spong Elementary School

- ❖ The CHROME Sponsors held an organizational meeting for old members and students who were interested in participating in the CHROME Club.
- ❖ A Norfolk Naval Shipyard (NNSY) representative presented a hands-on activity dealing with air and water pollution.
- ❖ CHROME Students participated in a Math and Science Olympic. Students enjoyed a variety of hands-on science and math activities.

Highland Biltmore Elementary School

- ❖ A mechanical engineer gave students activities on kinetic and potential energy, gravity, water pressure, and air pressure.
- ❖ A NOAA representative presented a hands-on activity on 'Longitude and Latitude' to demonstrate how to locate positions on a map and how to determine where and how storms will move.

- ❖ CHROME Students participated in a variety of hands-on activities that reinforced skills taught in their classes and gave students the opportunity to investigate, analyze, synthesize, manipulate, predict, problem solve and have fun with math and science.

Hodges Manor Elementary School

- ❖ Students made Lava Lamps. They were given instructions so they could make lava lamps at home with their parents.
- ❖ Students used toothpicks to make a variety of geometric designs.
- ❖ A NOAA representative presented a hands-on activity on 'Longitude and Latitude'. He demonstrated how to locate positions on a map and how to determine where and how storms will move. He also gave students free tokens from NOAA.

James Hurst Elementary School

- ❖ A volunteer reviewed greetings and numbers in Japanese. Students used their knowledge of geometry to make "Origami Art".
- ❖ Students visited Nauticus Maritime Center and attended the Weather Wonders demonstration. They explored different types of weather through experiment, air pressure, and key terminology associated with weather.
- ❖ Students made "Blow Straw Rockets". They played the universe game and reviewed the planets in the solar system.

John Tyler Elementary School

- ❖ Students identified clouds and made clouds using 2 liter bottles.
- ❖ Students made isotherm maps of temperatures in various areas.
- ❖ A demonstration of the high and low pressure was presented. The difference in air pressure caused a boiled egg to be sucked into a jar.

Lakeview Elementary School

- ❖ Students investigated the density of liquids. They made predictions about which liquid was denser. The students compared the density of water, vegetable oil, and syrup. They observed how different objects sank or floated (or were suspended) in the liquid. They also observed how the liquids formed layers according to their density when they were poured together in one container.
- ❖ Students did an activity on Salt Water and Fresh Water. Most of the water on Earth is salt water so the students investigated the ocean environment and the many life forms that the ocean supports.
- ❖ CHROME Students named properties of solids and liquids. They made 'Ooblecks' with water and cornstarch. They made observations and concluded that 'Ooblecks' behaved like both a liquid and a solid under different circumstances.

Park View Elementary School

- ❖ Students participated in a "Spaghetti Challenge". They worked in teams of two or more to make a structure out of dry spaghetti, tape, and clay.
- ❖ Students participated in the activity "Which Airplane Flies Best" in which they made paper airplanes. They chose the designs from a book and tested their airplanes.

Port Norfolk Elementary School:

- ❖ A BASF representative demonstrated what makes a Pamper absorb the wetness and why pampers become heavy after they are used.

- ❖ A Jefferson Lab representative had the students design a shipping package for 6 Pringles potato chips. She mailed the packages back to school and the group with the least amount of breakage and the lowest weight was the winner.
- ❖ NASA representative showed students how to make paper airplanes that would fly a great distance. He also showed them a film about astronauts and displayed tools he used for designing equipment at NASA.

S.H. Clarke Academy Elementary School

- ❖ At the first meeting new and former CHROME members discussed the meaning of CHROME and had to think of a math or science word that their name begins with (Example—I'm Laural, I like to work with labs). Students also discussed activities they would like to participate in this year.
- ❖ Students watched the video Watching the Weather. They also use hurricane-tracking charts to track storms.

Susie Keele Community CHROME Club

- ❖ Students visited the North Carolina State Museum of Natural Science. The revisiting of "A Flooded NC City" provided a year of intermittent "water and cultural heritage" focus through out the year. Nearly every month some member, sponsor, or parent reported some related information on the flooded community.
- ❖ Students participated in an extended project on "What is the Dismal Swamp and Why Should We Have Concerns"? The Consulting Engineer was Lorront Carney, NNSY. Students were divided into Research Teams/Engineering Performance Groups to explore and prepare a presentation for Afram Weekend. Here are some of the topics that were assigned:
 - Survival in the Dismal Swamp
 - The Dismal Swamp as an Underground Railroad
 - Wildlife Refuge and the Swamp
 - Animals in the Swamp now and then
 - The size of the Dismal Swamp
 - Problems of the Dismal Swap now and then
- ❖ Norfolk Naval Shipyard and Susie Keele Community CHROME Club celebrated "A Morning of E's (A program designed to; Expose, Enhance, Explore, Explain, Educate, and Excite participants about their Heritage and Engineering). A Waterfront Operations manager from NNSY was the keynote speaker.

Westhaven Elementary School

- ❖ A NOAA representative presented a hands-on activity on Longitude and Latitude. He talked about "CHROME Programs".
- ❖ A fourth grade teacher at Westhaven Elementary School presented information on Science Projects. Major topics of the presentation included research, problem (scientific question), hypothesis, project experiment, project conclusion, and sample project.
- ❖ CHROME Students attended Elementary Science Day at the Virginia Air and Space Center. CHROME Students, their parents and CHROME Sponsors attended and all day session of hands-on aerospace activities.

Middle School CHROME Clubs

Churchland Middle School

- ❖ A NOAA representative presented a hands-on activity on Topography.
- ❖ A Virginia Natural Gas representative demonstrated the properties of a gas. He led the students in an investigation of the elements and dangers of gas.
- ❖ An activity entitled "Mapping the Depth of the Ocean" was presented. Students were given a set of materials and tools to map the depths of the water. Their results were amazingly accurate.

Cradock Middle School

- ❖ Students used logo blocks to create simple machines and during the second students worked with experimental design projects.
- ❖ Students participated in a Holiday Engineering Olympics.
- ❖ Students also participated in an atmospheric science activity, "Characteristics of the Atmosphere".

Hunt-Mapp Middle School

- ❖ PASS students performed an experiment working with balloons, candles, and a plastic 2-liter bottle. They experimented with how sound waves affected a burning candle as it traveled through a container vs. no container.
- ❖ PASS students visited Philadelphia, Pennsylvania. They visited the Ben Franklin Institute and explored the numerous experimental designs within the Institute. They also visited the 'University of Science'.

W. E. Waters Middle School

- ❖ Students designed and launched "Hydro-rockets" and discussed how the types of fins affected the launch.
- ❖ A NOAA representative presented a map reading activity. Students made maps and identified the difference between maps and charts.
- ❖ BASF presentation on careers in 'Chemical engineering'. A discussion on the making of super absorbent materials was presented.

TEACHER TRAINING ACTIVITIES

Throughout the academic year of 2001-2002, teachers participating in the PASS Project had several opportunities to come together for teacher training activities. There were six official PASS training sessions and two training activities that were open to all CHROME sponsors operating CHROME clubs throughout Hampton Roads.

CHROME Sponsor Launch – Virginia Air and Space Center – October 12, 2001 (Regional Program)

Twenty-two PASS sponsors attended the opening program to introduce all teachers to the CHROME program. Teachers received training in the following areas: How to Start a CHROME Club and Parental Involvement. Sponsors were given Resource Packages, which contained activities and resource persons who could provide speakers, field trips, and special projects for students.



CHROME Sponsors register for the Launch at the Virginia Air and Space Center

The Virginia Air and Space Center also provided training for CHROME Sponsors. They presented an overview of Air and Space Center and Sessions on Space Colonies, the Teacher Resource Center, Liquid Nitrogen, and an IMAX movie 'Destiny in Space'.



CHROME Sponsors explore the resources at the Teacher Resource Center

PASS Training Session # 1 – October 17, 2001

Twenty-six PASS sponsors attended the initial training session held at Douglass Park Elementary School to discuss the expectations of the club sponsors. The Executive Director of CHROME gave an overview of CHROME. The PASS Facilitator gave information on 'CHROME Club Record Keeping.

Jim Lawrence Meteorologist, WAVY TV 10 Weather Prediction

Mr. Jim Lawrence a meteorologist from WAVY TV 10 gave an overview of the stations educational outreach and a presentation on "Weather Prediction". His presentation included information on cloud formation, storm surge, hurricanes, cold fronts, and warm fronts.



Jim Lawrence from WAVY TV 10 delivered a presentation on weather prediction.

PASS Training Session # 2 – November 14, 2001

Twenty-six PASS sponsors and one pre-service-teacher attended the second official training session held at Douglass Park Elementary. Karen Clark, from the Virginia Marine Science Museum, presented information on the Sea Scholars Program. Gresha Brown, from the NASA Student Involvement Program (NSIP), presented information on the program and how it related to elementary and secondary students. Ms. Angela M. Jenkins, Pass Facilitator, also presented a continuation of the session on “CHROME Club Record Keeping”. Sponsors were given diskettes, which contained documents and forms that could be used for Club record keeping and giving training in the use of word processor, databases, and spreadsheets.

PASS Training Session # 3 – January 23, 2002

Twenty PASS sponsors and on (1) pre-service teacher attended the workshop held at Douglass Park Elementary School. Norris Wike, from the National Oceanic and Atmospheric Administration (NOAA), presented information on hurricane tracking and how hurricanes are formed. The PASS Project Facilitator presented information on CHROME Club Data Collection.

PASS Training Session # 4 – February 27, 2002

Twenty-five PASS sponsors and one pre-service teacher attended the fourth training session. Mrs. Annie Gunter, PASS Facilitator, presented atmospheric science activities that could be used at CHROME meetings.



CHROME Sponsor Appreciation Day – March 14, 15, and 16, 2001 (Regional Program)

Sixteen PASS sponsors attended the over night excursion to Morehouse College and Georgia Tech University, located in Atlanta Georgia. PASS Sponsors left for Georgia on Thursday, March 14, 2002 and visited Morehouse College for a reception and a special presentation. On Friday, March 15, 2002 sponsors went to the Georgia Tech University where they attended training sessions on “Bottled Rockets”, “Copper Penny”, and Mouse Cars”. They also toured the Georgia Tech campus. Later that evening, Pass Sponsors had dinner “Agatha's Mystery Dinner Theater”. On Saturday, March 16, 2002 PASS Sponsors visited Grady Memorial Hospital and returned home early Saturday evening. This was a wonderful experience for our PASS Sponsors.

PASS Training Session # 5 – March 27, 2002

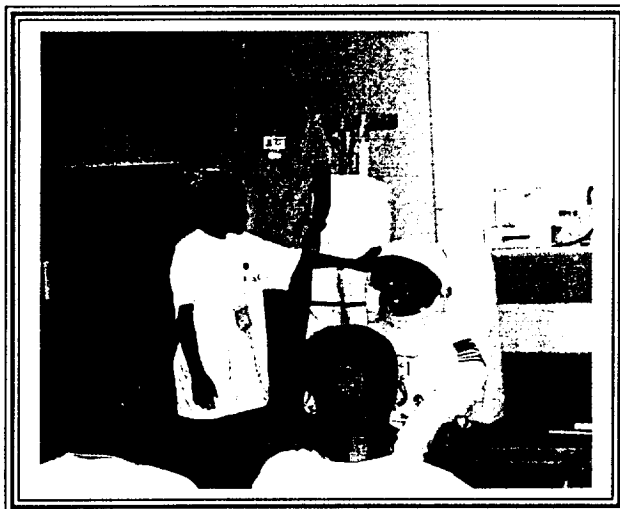
Twenty-eight PASS sponsors and one (1) pre-service teacher attended the fifth training session. Mr. Bill Lee, Education Program Manager for the Virginia Air and Space Center, gave an overview of the Air and Space Center and the Teacher Resource Center. PASS Sponsors were given information on tours, demonstrations, programs and I-Max movies. Information was also given about over-night field trips and special summer academies.

PASS Training Session # 6 – May 1, 2002

Fifteen PASS sponsors attended the last training session. Mr. Doug Stoddard with the NASA C'ERES S'COOL Project presented a training session on "Cloud Observation". He also presented a session on "On-Line Cloud observation" and showed sponsors how to record the data on the computer at the NASA C'ERES S'COOL Web Site. Mrs. Gunter and Ms. Jenkins-Whitfield assisted Mr. Stoddard on the computer lab.

YOUNG PHDs (PERSONS HAVING DREAMS) IN ATMOSPHERIC SCIENCES ACADEMY

The club activities were supplemented with a summer academic program for summer 2002. The program entitled "**Young PHDs (Persons Having Dreams) in Atmospheric Sciences**" was held during the weeks of July 15th and July 29th at Cradock Middle School in Portsmouth, Virginia. The program had more than fifty student participants during summer 2002. There were two sessions offered to students participating in the PASS Project. Students were introduced to concepts surrounding the earth, weather, and changes in our atmosphere. The students conducted experiments and took field trips to Norfolk State University, the Virginia Air and Space Center, the Chincoteague National Wild Life Refuge, and the NASA Facility at Wallops Island. These field trips helped to bring all the concepts from the program together. Topics for the program included: The Atmosphere -- An Ocean of Air, Predicting the Coming Weather, Measuring Air Pressure, Earth Heat, and Temperature of the Atmosphere, Wind, Precipitation, and Air Pollution.



Beritt Bland from the NASA Facility at Wallops Island explains to Young PHDs Students about survival in space and micro-gravity.

ASSESSING YEAR 3 OBJECTIVES (OUTCOMES)

Upon review of the programs conducted during Year 2 of the Portsmouth Atmospheric Science (PASS) School Project, it is important to look back at the year to assess the objectives for the Year. Categorized below are the outcomes of each of the eight objectives for Year 3 and the goals achieved for each.

1) The curricula in atmospheric science and a resource guide were been printed and distributed to all CHROME Sponsors. Additionally, new resources and activities were added to the resource guide for the 2001-2002 school year. A curriculum was created for the Summer 2002 program - Young PHDs (Persons Having Dreams) in Atmospheric Sciences.

2) A school network system was enhanced by Marcella McNeil, Curriculum Supervisor for Mathematics, and Laura Nelson, Curriculum Supervisor for Science. Dr. Daisy Murphy, Director of Instruction for Elementary, was also a key liaison for the project. Angela Jenkins-Whitfield, PASS Facilitator, Eleanor Wilson, CHROME Executive Director, and Dr. Clarence D. Coleman, Associate Vice President for Advancement at Norfolk State University, communicated with all elementary and middle school principals. As a result, office space was established and maintained at Douglass Park School for the PASS Facilitator. Club sponsors were able to send correspondence through the school mail system and contact the PASS Facilitator at the local office.

3) There were three pre-service teachers identified who attended the initial PASS training session on November 2000. These pre-service teachers were students at Norfolk State University. They attended several PASS meetings and participated in activities that assisted in working with CHROME Clubs. A greater push was made in Year 3 to have pre-service teachers get more involved with the club process and present hands-on activities at CHROME Club Meetings. However, one of the original students graduated in the spring of 2001 and there were only two pre-service teachers for the 2001-02 school year.

4) An afternoon kick-off session was held at Norfolk State University for teachers and pre-service teachers who were interested in hearing about the program. Teachers were also invited to attend the CHROME Sponsor Launch at the Virginia Air and Space Museum.

5) Fourteen elementary, four middle school and one (1) community CHROME Club participated in the PASS Project in Year 3. All middle schools now have CHROME Clubs and are a part of the project but there are still five (5) elementary schools that do not have CHROME Clubs. However, every attempt was made by the PASS Facilitator to contact the remaining school principals. All correspondence, including letters and memos sent to principals has been documented. It is our goal this year to implement CHROME Clubs in the five (5) remaining elementary schools and the three high schools.

6) The student recruitment goal of 250 elementary and middle students has been exceeded by 266 students. At the end of the project there were 516 students enrolled in the program from 19 participating school and community clubs.

7) The clubs were involved in exciting hands-on activities throughout the year. Further details can be found in the "Club Activities" section of this report. The PASS Facilitator, conducted sessions for PASS Sponsors on "How to Run a Successful CHROME Club" and "CHROME Record Keeping. During Year 3 the PASS Facilitator made visits to clubs for support and recommendations.

8) The club activities were supplemented with an academic program for summer 2002. The program entitled "**Young PHDs (Persons Having Dreams) in Atmospheric Sciences**" was held during the weeks of July 15 through July 19, 2002 and July 29 through August 3, 2002, at Cradock Middle School in Portsmouth, Virginia. More than fifty students participated in the Young PHDs Summer Academy and parents expressed an interest in seeing the program continued in the future.